

DESCRIPTION"A BRUSH"

The present invention relates to a brush and more specifically to a brush for use in a cleaning tool for removing debris from the interior wall of a pipeline or well casing alone or in combination with solvents.

Due to operating and environmental conditions, oil, gas and water well casings and pipes require regular cleaning to remove debris and deposits which build up over time. A wide variety of cleaning tools for this purpose are known, including several which rely on bristles disposed in and around the outer surface of the cleaning tool.

One such cleaning tool is disclosed in GB-2299599 and comprises a body member having one or more cleaning pads each mounted in a respective recess in the outer surface thereof and secured in place by a removable retaining device. Each of the cleaning pads comprises a body which may be comprised of aluminium or polyurethane fibre compound from an outer face of which bristles protrude. The bristles are mounted to a backing material of fabric or soft rubber material which is bonded to the body.

Another such cleaning tool is disclosed in PCT/US93/08040 and comprises a cylindrical metal sleeve which supports a jacket of foam like material. A swath of steel bristles extends helical around the jacket. This helical swath comprises a fabric backing strip into which the steel bristles are inserted. To minimise the likelihood of the bristles coming loose from the fabric backing strip the bristles are formed from U-shaped staples which are inserted through the rearward surface of the fabric backing strip.

In the wire brush industry, wire brushes are made by inserting steel bristles into pre-drilled holes in a brush body. These bristles are held in place by:

1. The push-fit of the bristle bundle in the pre-drilled hole, and/or
2. The outward pressure applied to the hole sides by a staple which is wrapped round the wire bundle as it is punched into the hole.

Where the brush body is comprised of a relatively soft material, such as plastics or wood, it allows the "spring" in the staple to make a slight indentation in the hole side, into which the staple relaxes. This gripping action by the staple then resists the removal of the bristle bundle. However, when the bristle bundle is punched into a metal brush body, the staple cannot open up and grip the hole in the same manner due to the hard, non-yielding nature of the metal body. This means that the bristle bundle is only held in by the friction at the bundle itself and the friction at the staple against the side of the hole.

It is an object of the present invention to provide a brush for use in a cleaning tool of the general type described hereinbefore which provides improved bristle retention.

According to the present invention there is provided a brush comprising a first body and a second body mounted on the first body, the first body having a first set of holes therein and the second body having a second set of through holes therein corresponding in number and spacing to the first set of through holes, wherein the first body is moveable relative to the second body between a first position in which each hole in the first set is aligned with a respective hole in the second set to receive

therethrough a bristle bundle, and a second position in which each pair of holes is misaligned to clamp the bristle bundle, and means for retaining the first body in the second position.

In a preferred embodiment of the present invention the first body comprises a cylinder and the second body comprises a cylindrical sleeve in which the first body is coaxially received. The inner cylinder may be moved longitudinally relative to the cylindrical sleeve between the first and second positions, or it may be rotated. The brush may comprise part of a cleaning tool or be adapted to be coupled to a cleaning tool. Alternatively, the brush may form a portion of a length of drill string.

In an alternative embodiment of the present invention the first and second bodies define a cleaning pad which is adapted in use to be mounted on a cleaning tool such as the one described in GB-2299599.

The bristles may be of nylon. Alternatively, the bristles may be of wire, such as flame hardened steel or copper. Preferably, a staple or ring is wrapped around the inner end of each bristle bundle to further improve retention thereof between the first and second bodies.

The first and second bodies may be comprised of a resin fibre compound, for example, polyurethane fibre compound, or may be comprised of a malleable metal such as aluminium.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 shows a detail of a brush in accordance with the present invention in

which the first and second bodies thereof are in the first position; and

Fig. 2 which shows the first and second bodies in the second position to grip and clamp a bristle bundle.

Referring to the drawings the brush comprises a first body 1 and a second body

2. The first and second bodies 1 and 2 may be essentially planar and form a brush pad, or they may comprise a cylinder and an outer cylindrical sleeve slidable on the cylinder. In the detail of the brush shown in the drawings only one bristle bundle receiving hole is shown, but of course in the complete brush there are several bristle bundle receiving holes, the number, spacing and pattern of which is selected in accordance with the intended application. Each bristle bundle receiving hole is comprised of a through hole 3 in the second body 2 and a blind hole 4 in the first body 1. A bristle bundle 5 is located through the through hole 3 and into the blind hole 4.

As shown in Fig. 1 the first and second bodies 1 and 2 are positioned such that the through hole 3 is aligned with the blind hole 4. In this position the bristle bundle 5 can be freely inserted and withdrawn. As shown in Fig. 2 the first body 1 has been displaced relative to the second body 2 to form a staggered hole configuration between the through hole 3 and the blind hole 4. This staggered hole configuration effects a clamping action on the bristle bundle 5 and thereby prevent its withdrawal. To further improve retention of the bristle bundle 5 between the first and second bodies 1 and 2, a staple or ring 6 is wrapped around the innermost end thereof.

Once the first and second bodies have been displaced by the requisite amount, a locking pin/bolt or some position fixing method is applied to ensure that the first and

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second bodies remain in the displaced position.

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